

73rd MORSS CD Cover Page

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Quick-Look Force Closure Estimates Using the Strategic Mobility Model



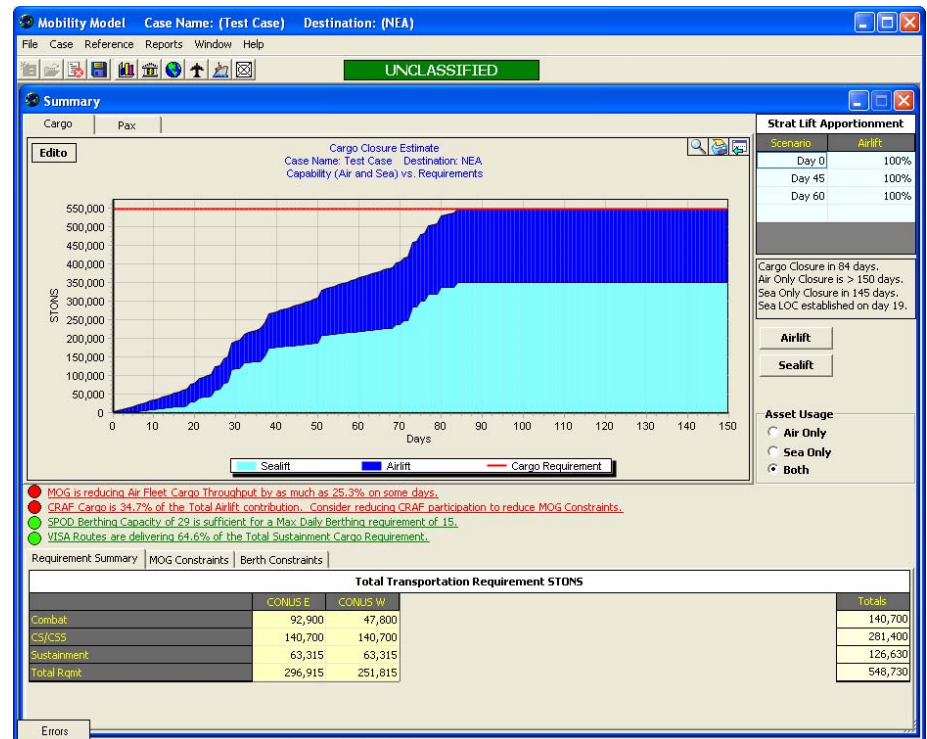
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Mobility Model Intro

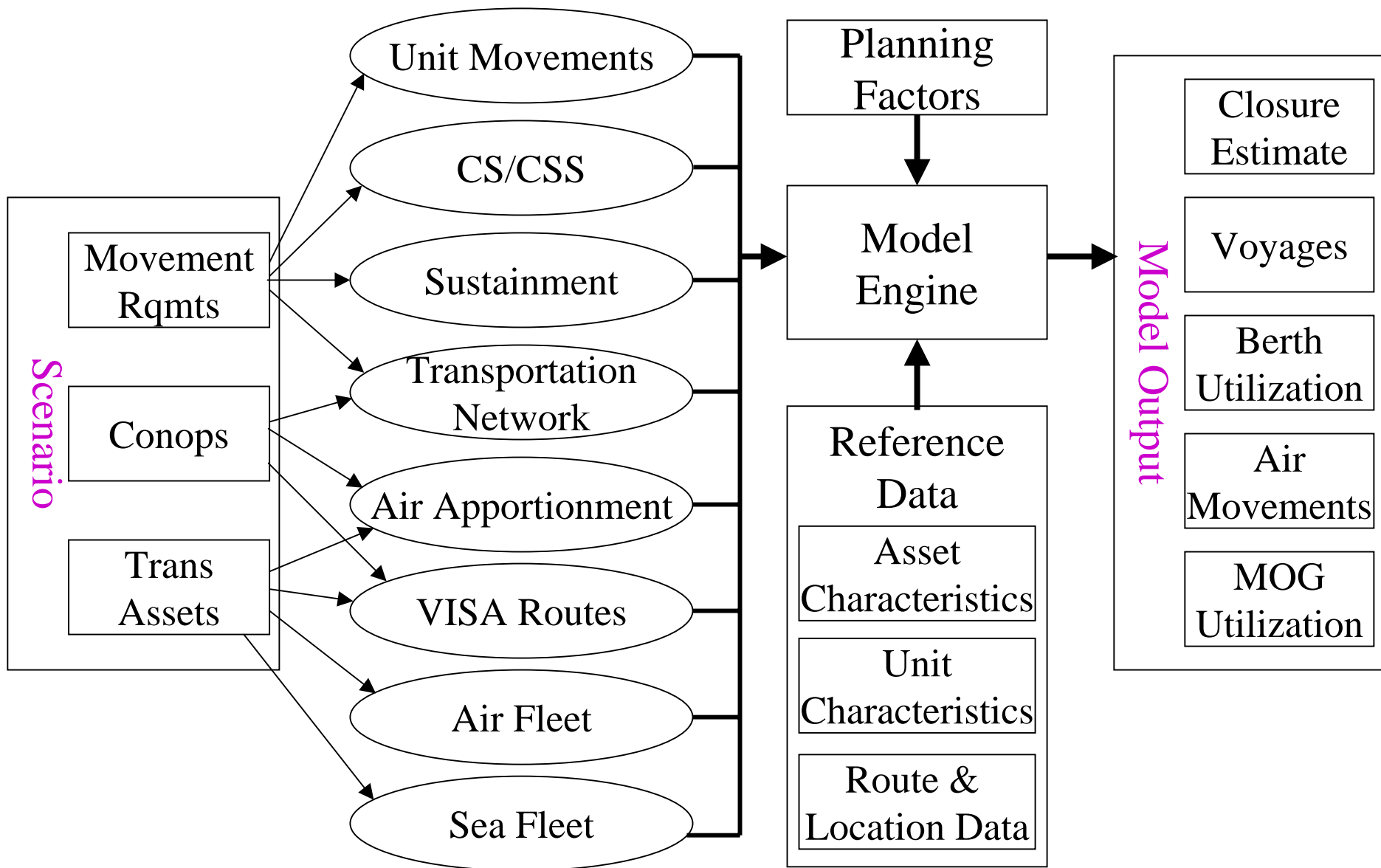
- Provides intuitive, quick closure estimates for roughly defined scenarios
- Use when higher fidelity models are impractical
 - Lack of data
 - Lack of time
- Evolution of USTRANSCOM “PinCushion” spreadsheet tool
 - Adds Scenario data management
 - More user-friendly
 - Sealift modeled at the Voyage level

Mobility Model Intro

- Air & Sea Force Closure Estimator
 - Requirements (Combat Units, CS/CSS, Sustainment)
 - Assets (Aircraft, Ships)
 - Transportation Network (Origin-En Route-Destination Links)
- Aggregate Level Tool
 - Gross STons & Pax
 - MOG & Berths
 - Aggregated by Region
 - Destination is a Single APOD/SPOD Region



Mobility Model Architecture



Reference Data

Reference Data: Transportation Network

Available Regions

Regions

Region	MOG	Berths	RSOI (days)
CONUS E	10.00	99	4
CONUS G	99.00	9	3
CONUS W	99.00	15	3
EUROPE S	99.00	1	2
EUROPE W	99.00	7	2
NEA	99.00	29	2
SWA	99.00	5	2

Routes

Air Distance | Sea Distance | Enroute MOG | Canals


		DESTINATIONS						
		CONUS E	CONUS G	CONUS W	EUROPE S	EUROPE W	NEA	SWA
ORIGINS	CONUS E		486	1,170	4,567	3,960	6,475	6,779
	CONUS G	486		767	5,053	4,446	6,072	7,265
	CONUS W	1,170	767		5,737	5,130	5,305	7,949
	EUROPE S	4,567	5,053	5,737		607	9,215	2,502
	EUROPE W	3,960	4,446	5,130	607		9,534	2,819
	NEA	7,647	7,244	6,477	9,215	9,534		7,048
	SWA	6,779	7,265	7,949	2,502	2,819	7,048	

Defaults

OK

Cancel

Reference Data: Combat Units



Unit Id	STons	Sq Ft.	PAX	Support Ratio
IBCT	14,500	290,000	5,000	2.00
Hvy Bde	35,000	700,000	15,000	2.00
MEB	45,667	913,340	12,000	2.00
Fighter Sqdn	5,000	100,000	600	2.00
BE	600	12,000	100	2.00
MEF	137,000	2,740,000	25,000	2.00
PATRIOT	100,000	2,000,000	1,200	2.00
Air Assault Bde	17,000	340,000	14,000	2.00
Lt Bde	7,900	158,000	10,000	2.00

Defaults OK Cancel

Reference Data: Assets

Aircraft

Aircraft Type	CRAF	UTE Rate		Payload		Block Speed	Ground Time			MOG Equiv	PM Fleet
		Sustained	Surge	STON	PAX		APOE	APOD	Enroute		
C005	<input type="checkbox"/>	8.40	11.00	61.3	102	409	3.25	3.25	4.25	1.00	37
C017	<input type="checkbox"/>	13.90	15.20	45.0	102	410	2.25	2.25	2.25	1.00	45
C141	<input type="checkbox"/>	9.70	12.00	19.0	10	394	2.25	2.25	2.25	1.00	28
CRAF CARGO	<input checked="" type="checkbox"/>	10.00	10.00	55.0	0	444	3.00	3.00	3.00	1.00	25
CRAF PAX	<input checked="" type="checkbox"/>	10.00	10.00	0.0	280	439	2.00	2.00	1.50	1.00	25
KC010	<input type="checkbox"/>	12.50	15.00	32.6	0	434	3.25	3.25	3.25	1.00	51
	<input type="checkbox"/>										

Defaults

OK Cancel

Ship

Ship Id	Ship Type	Ship Class	Speed	Characteristics					Defaults					
				Cgo Transfer Time	Capacity TEU	Capacity Sq Ft.	Capacity MTons	Max Cargo Dead Weight	Fleet	Quantity	Activation Day	Initial Region Location	Travel Time To Initial SPOE	Max Sailings
Callaghan	RORO	Callaghan	21.0	2	0	153,825	0	10,332	RRF	1	5	CONUS W	1	99
Cape D	RORO	Cape D	16.0	2	0	167,339	0	15,692	RRF	5	5	CONUS E	1	99
Cape Edmont	RORO	Cape E	16.0	2	0	161,372	0	16,016	RRF	1	5	CONUS E	1	99
Cape F	BARGE	LASH	19.0	7	0	0	40,306	31,016	RRF	2	10		1	99
Cape Fear	BARGE	LASH	19.0	7	0	0	40,306	19,658	RRF	1	10	CONUS W	1	99
Cape Florida	BARGE	LASH	19.0	7	0	0	40,306	19,658	RRF	1	5		1	99
Cape G	BREAKBULK	Cape G	19.0	3	0	0	27,583	15,740	RRF	2	5	CONUS W	1	99
Cape H	RORO	Cape H	17.0	2	0	214,365	0	28,988	RRF	3	5	CONUS W	1	99
Cape I	RORO	Cape I	19.0	2	0	149,089	0	14,560	RRF	4	5	CONUS W	1	99
Cape J	BREAKBULK	Cape J	18.0	3	0	0	18,310	9,740	RRF	2	20	CONUS E	1	99
Cape John	BREAKBULK	Cape J	18.0	3	0	0	18,310	9,740	RRF	1	20		1	99
Cape K	RORO	Cape K	17.0	2	0	146,896	0	24,191	RRF	2	5		1	99
Cape L	RORO	Cape L	16.0	2	0	75,644	0	15,144	RRF	2	10	CONUS E	1	99

Defaults

OK Cancel

Model Setup

Step 1: Define Transportation Network

Transportation Network

Destination Region	MOG	Berths	RSOI (days)
NEA	99.00	29	2

Origin Region	MOG	Berths	CSS/CS %	Sustainment %
CONUS E	10.00	99	50%	50%
CONUS G	99.00	9	0%	0%
CONUS W	99.00	15	20%	50%
NEA	99.00	29	30%	0%

Total	100	100
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From Region	To Region	Air Distance	Sea Distance	Enroute MOG	Canals
CONUS E	NEA	6,475	10,388	3.00	<input checked="" type="checkbox"/>
NEA	CONUS E	7,647	10,388	10.00	<input checked="" type="checkbox"/>
CONUS G	NEA	6,072	0	0.00	<input type="checkbox"/>
NEA	CONUS G	7,244	0	0.00	<input type="checkbox"/>
CONUS W	NEA	5,305	5,201	3.00	<input type="checkbox"/>
NEA	CONUS W	6,477	5,201	3.20	<input type="checkbox"/>

Step 2: Define Movement Requirements

Requirements

Destination: NEA

Sustainment Ratio for (Combat & CS/CSS): 0.3
CS/CSS Cargo Density (SqFt/STon): 25
Sustainment Cargo Density (SqFt/STon): 30

Combat Unit Data			# Combat Units By Origin				Requirement Summary		
Unit Type	STons	CS/CSS Ratio	CONUS E	CONUS G	CONUS W	NEA	Unit Totals	Combat (STons)	CS/CSS (STons)
Air Assault	17,000	2.00	0.00	0.00	1.00	0.00	1.00	17,000	34,000
BE	600	2.00	0.00	0.00	0.00	0.00	0.00	0	0
Fighter Sqdn	5,000	2.00	3.00	0.00	3.00	0.00	6.00	30,000	60,000
Hvy Bde	35,000	2.00	3.00	1.00	0.00	3.00	7.00	245,000	490,000
IBCT	14,500	2.00	0.00	0.00	0.00	0.00	0.00	0	0
Lt Bde	7,900	2.00	1.00	0.00	2.00	0.00	3.00	23,700	47,400
MEB	45,667	2.00				0.00	0.00	0	0
MEF	137,000	2.00				0.00	0.00	0	0
PATRIOT	100,000	2.00				0.00	0.00	0	0
							Totals	315,700	631,400

The proportion of the sustainment originating from this region. (Percent)

Max Value: 100
Min Value: 0
Precision: 0

	CONUS E	CONUS G	CONUS W	NEA
CS/CSS % By Origin	50%	0%	20%	30%
Sustainment % By Origin	50%	0%	50%	0%

Total Transportation Requirement STONS				
Combat	127,900	35,000	47,800	0
CS/CSS	315,700	0	126,280	0
Sustainment	142,065	0	142,065	0
Total Rqmt	585,665	35,000	316,145	0
Pct of Transportation Rqmt	62.52%	3.74%	33.75%	0%

210,700
441,980
284,130
936,810

% No Move
23.91%

Step 3: Define Assets

Transportation Assets

Air Fleet

Aircraft Type	Quantity	CRAF	UTE Rate		Payload		Block Speed	Ground Time			MOG Equiv	PM Fleet
			Sustained	Surge	STON	PAX		APOE	APOD	Enroute		
C005	50	<input type="checkbox"/>	8.40	11.00	61.3	102	409	3.25	3.25	4.25	1.00	37
C017	46	<input type="checkbox"/>	13.90	15.20	45.0	102	410	2.25	2.25	2.25	1.00	45
C141	12	<input type="checkbox"/>	9.70	12.00	19.0	10	394	2.25	2.25	2.25	1.00	28
CRAF CARGO	60	<input checked="" type="checkbox"/>	10.00	10.00	55.0	0	444	3.00	3.00	3.00	1.00	25
CRAF PAX	20	<input checked="" type="checkbox"/>	10.00	10.00	0.0	280	439	2.00	2.00	1.50	1.00	25
KC010	15	<input type="checkbox"/>	12.50	15.00	32.6	0	434	3.25	3.25	3.25	1.00	51

Sea Fleet

Ship Id	Fleet	Quantity	Activation Day	Initial Region Location	Travel Time To Initial SPOE	Max Sailings
F55(E)	MSC	4	4	CONUS E	1	99
F55(G)	MSC	4	4	CONUS G	1	99
Shughart	MSC	1	4	CONUS E	1	99
Yano	MSC	1	4	CONUS E	1	99
Gilliland	MSC	1	4	CONUS E	1	99
Gordon	MSC	1	4	CONUS E	1	99
LMSR(E)	MSC	2	4	CONUS E	1	99
LMSR(G)	MSC	5	4	CONUS G	1	99
Cape T	RRF	3	5	CONUS G	1	99
Cape V	RRF	2	5	CONUS G	1	99
Cape Orlando	RRF	1	5	NEA	1	99
Cape K	RRF	2	5	CONUS G	1	99
Cape Edmont	RRF	1	5	CONUS E	1	99
Cape D	RRF	5	5	CONUS E	1	99

Clear

Append

VISA Routes

Step 3: Define Assets (con't)

Transportation Assets

Air Fleet

Aircraft Type	Quantity	CRAF	UTE Rate		Payload		Block Speed	Ground Time			MOG Equiv	PM Fleet
			Sustained	Surge	STON	PAX		APOE	APOD	Enroute		
C005	50	<input type="checkbox"/>	8.40	11.00	61.3	102	409	3.25	3.25	4.25	1.00	37
C017	46	<input type="checkbox"/>	13.90	15.20	45.0	102	410	2.25	2.25	2.25	1.00	45
C141	12	<input type="checkbox"/>	9.70	12.00	19.0	10	394	2.25	2.25	2.25	1.00	28
CRAF CARGO	60	<input checked="" type="checkbox"/>	10.00	10.00	55.0	0	444	3.00	3.00	3.00	1.00	25
CRAF PAX	20	<input checked="" type="checkbox"/>	10.00	10.00	0.0	280	439	2.00	2.00	1.50	1.00	25
KC010	15	<input type="checkbox"/>	12.50	15.00	32.6	0	434	3.25	3.25	3.25	1.00	51

Sea Fleet

Ship Id	Fleet	Quantity	Activation Day	Initial Region Location	Travel Time To Initial SPOE	Max Sailings
F55(E)	MSC	4	4	CONUS E	1	99
F55(G)	MSC	4	4	CONUS G	1	99
Shughart	MSC	1	4	CONUS E	1	99
Yano	MSC	1	4	CONUS E	1	99
Gilliland	MSC	1	4	CONUS E	1	99
Gordon	MSC	1	4	CONUS E	1	99
LMSR(E)	MSC	2				
LMSR(G)	MSC	5				
Cape T	RRF	3				
Cape V	RRF	2				
Cape Orlando	RRF	1				
Cape K	RRF	2				
Cape Edmont	RRF	1				
Cape D	RRF	5				

Clear

Append

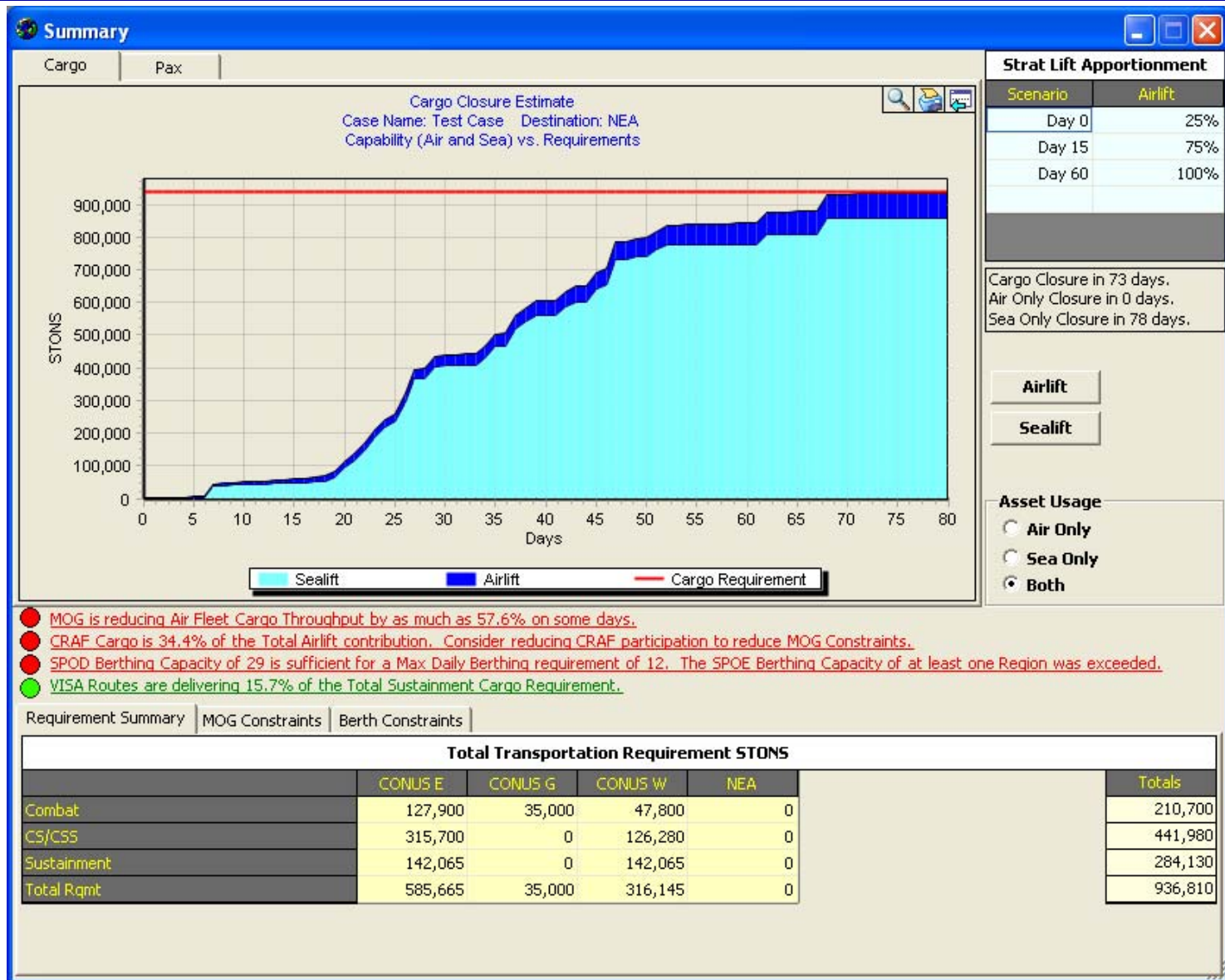
VISA Routes

Origin	Start Day	Capacity On Route (STons)	Cycle Time (Days)	Daily Capacity (STons/Day)
CONUS E	5	15,000	25	600
CONUS W	5	15,000	25	600

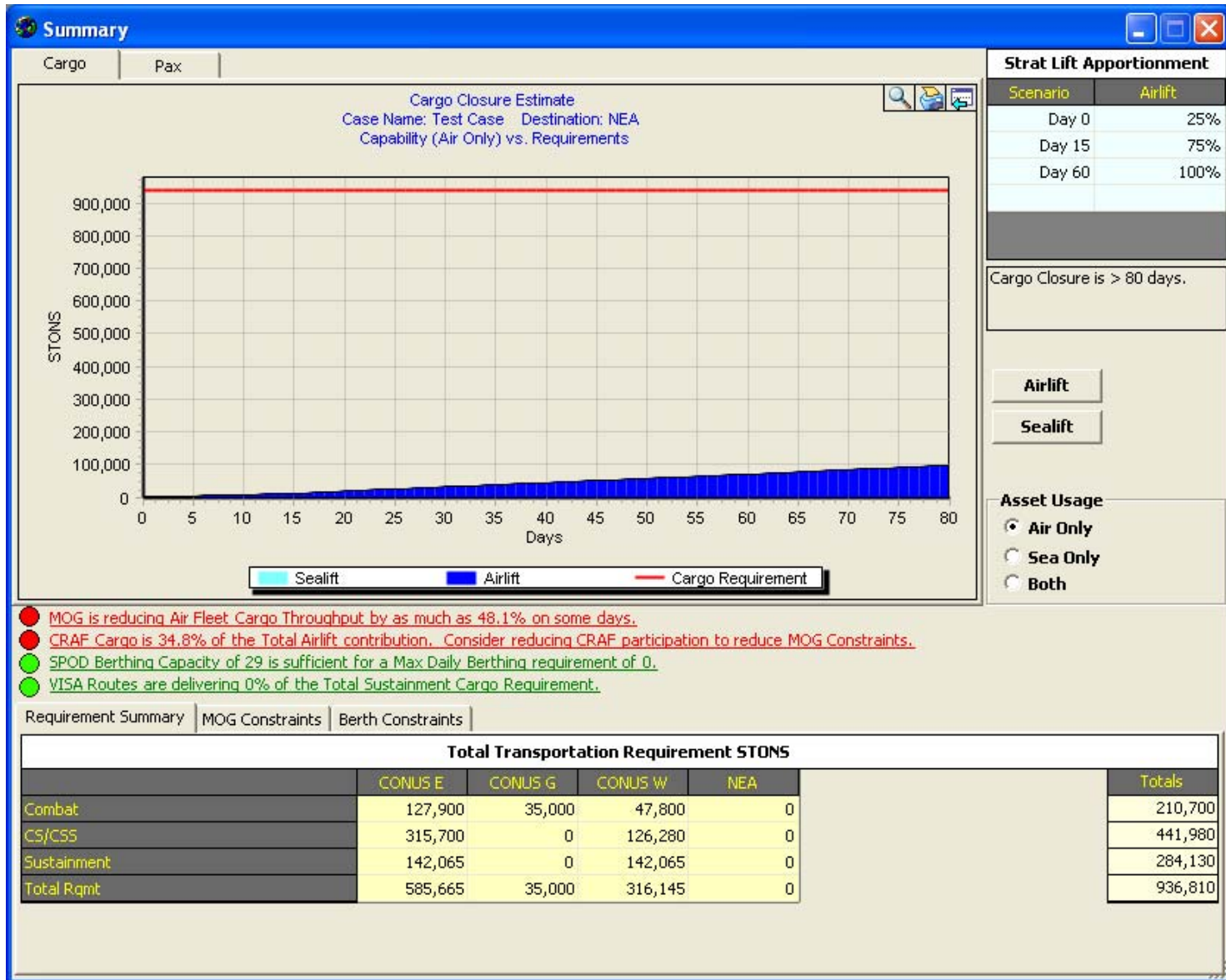
VISA Routes

Results

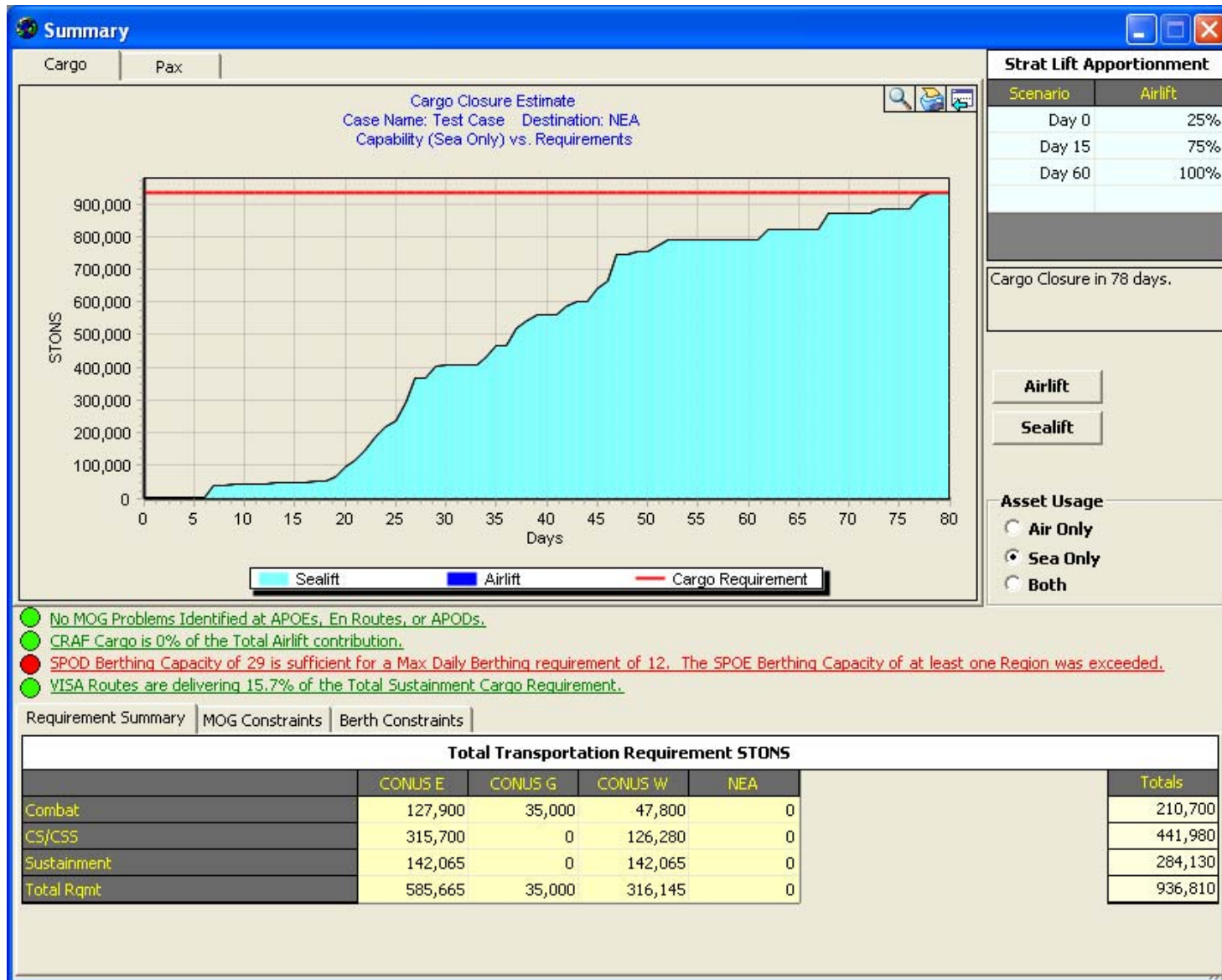
Results: Closure Estimate



Results: Closure Estimate (Air Only)



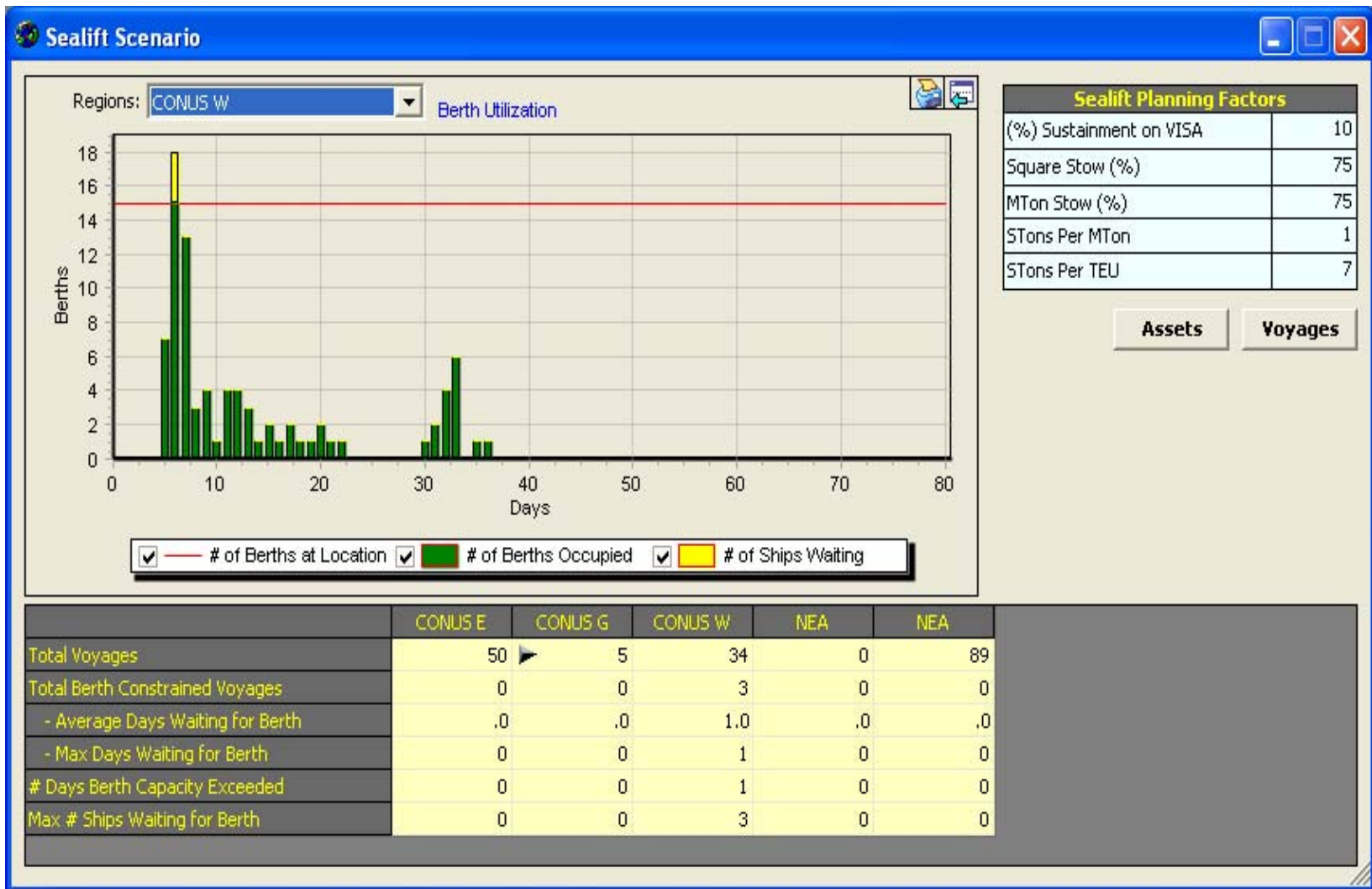
Results: Closure Estimate (Sea Only)



Results: Voyages

Voyages													
Voyage Id	Ship Id	Voyage Number	SPOE	Origin Arrival	Origin Departure	Destination Arrival	Destination Departure	Cargo Load	% Net Capacity	Sustainment Load	SPOE Wait Time	SPOD Wait Time	
21	Cape T #2	1	CONUS W	5	7	21	23	3,358	100%	1,505	0	0	
22	Cape T #3	1	CONUS W	5	7	21	23	3,358	100%	1,505	0	0	
23	Cape V #1	1	CONUS W	5	7	22	24	3,801	100%	1,704	0	0	
24	Cape V #2	1	CONUS W	5	7	22	24	3,801	100%	1,704	0	0	
25	Cape Orlando #1	1	CONUS W	19	21	35	37	3,398	100%	1,469	0	0	
26	Cape K #1	1	CONUS W	5	7	20	22	4,186	100%	1,876	0	0	
27	Cape K #2	1	CONUS W	5	7	20	22	4,186	100%	1,876	0	0	
28	Cape Edmont #1	1	CONUS E	6	8	36	38	4,853	100%	1,168	0	0	
29	Cape D #1	1	CONUS E	6	8	36	38	5,033	100%	1,211	0	0	
30	Cape D #2	1	CONUS E	6	8	36	38	5,033	100%	1,211	0	0	
31	Cape D #3	1	CONUS E	6	8	36	38	5,033	100%	1,211	0	0	
32	Cape D #4	1	CONUS E	6	8	36	38	5,033	100%	1,211	0	0	
33	Cape D #5	1	CONUS E	6	8	36	38	5,033	100%	1,211	0	0	
34	Cape I #1	1	CONUS W	6	8	19	21	4,249	100%	1,900	0	0	
35	Cape I #2	1	CONUS W	6	8	19	21	4,249	100%	1,900	0	0	
36	Cape I #3	1	CONUS W	6	8	19	21	4,249	100%	1,900	0	0	
37	Cape I #4	1	CONUS W	6	8	19	21	4,249	100%	1,900	0	0	
38	Cape R #1	1	CONUS E	6	8	34	36	5,303	100%	1,276	0	0	
39	Cape R #2	1	CONUS E	6	8	34	36	5,303	100%	1,276	0	0	
40	Cape R #3	1	CONUS E	6	8	34	36	5,303	100%	1,276	0	0	
41	Callaghan #1	1	CONUS W	6	8	18	20	4,384	100%	1,961	0	0	
42	Cape H #1	1	CONUS W	6	8	21	23	6,110	100%	2,732	0	0	
43	Cape H #2	1	CONUS W	6	8	21	23	6,110	100%	2,732	0	0	
44	Cape H #3	1	CONUS W	6	8	21	23	6,110	100%	2,732	0	0	
45	Cape W #1	1	CONUS E	6	8	38	40	8,901	100%	2,142	0	0	
46	Cape W #2	1	CONUS E	6	8	38	40	8,901	100%	2,142	0	0	
47	Cape May #1	1	CONUS E	6	13	41	48	17,270	100%	4,156	0	0	
48	Cape Mohican #1	1	CONUS W	6	14	28	35	17,270	100%	7,700	1	0	
49	Cape G #1	1	CONUS W	6	10	21	24	15,740	100%	7,018	1	0	
50	Cape G #2	1	CONUS W	6	10	21	24	15,740	100%	7,018	1	0	
51	Cape Florida #1	1	CONUS E	5	12	36	43	19,658	100%	4,750	0	0	

Results: Berth Utilization



Results: Air Movements & MOG Ute

Airlift Scenario

Aircraft Planning Factors

Airlift Productivity Factor (%)	93
CRAF Warning (%)	10
MOG Efficiency (%)	85
Surge Start	5
Surge Duration (Days)	30
CRAF Utilizes Enroute MOG	<input checked="" type="checkbox"/>

Critic Notes

Airlift Summary By Day

	CONUS E	CONUS G	CONUS W	NEA	Total	% Airlift Acft Contribution
APOE Rqmt Distribution (%)	62.52 %	3.74 %	33.75 %	0.00 %		
Air Capacity Distribution (%)	83.71 %	2.43 %	13.86 %	0.00 %		
Day 0 (Apportionment = 25%, Ops Tempo = SUSTAINED)						
MOG Lift Capacity Reduction (%)	0.00 %	0.00 %	0.00 %	0.00 %	0.00%	
Constraint ID	NONE	NONE	NONE	NONE		
Total Actual Cargo Fleet	558	0	111	0	669	
Total Actual Pax Fleet	955	0	190	0	1,145	
Day 5 (Apportionment = 25%, Ops Tempo = SURGE)						
MOG Lift Capacity Reduction (%)	0.00 %	0.00 %	0.00 %	0.00 %	0.00%	
Constraint ID	NONE	NONE	NONE	NONE		
Total Actual Cargo Fleet	628	0	125	0	753	
C005	190	0	38	0	228	30.24 %
KC010	44	0	9	0	53	6.98 %
CRAF PAX	0	0	0	0	0	0.00 %
C017	178	0	35	0	213	28.29 %
CRAF CARGO	202	0	40	0	242	32.13 %
C141	15	0	3	0	18	2.36 %
Total Actual Pax Fleet	1,066	0	212	0	1,277	
Day 15 (Apportionment = 75%, Ops Tempo = SURGE)						
MOG Lift Capacity Reduction (%)	50.28 %	0.00 %	0.00 %	0.00 %	41.95%	
Constraint ID	ENROUTE	NONE	NONE	NONE		

Coming Soon ...

- Multiple Theaters
- Sealift Apportionment
- Multiple Destinations
- Cargo Stratification